

MAPPING THE DENSITIES OF EXOTIC NUCLEI

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Measurements of electron scattering form factors from exotic nuclei are becoming a reality with the development of the SCRIT Project at RIKEN, as well as the possibility of the ELISE project at FAIR/GSI. Such measurements will elicit directly information of the charge densities of exotic nuclei. In the case of neutron-rich exotic nuclei, most of the studies have concentrated on the skin or halo aspects of the neutron density, while treating the proton density as contained in the core. Very little information has been obtained about the proton density in exotic neutron-rich nuclei, as a result.

Intermediate energy proton scattering in the inverse kinematics, with typical energies of around $40A$ MeV, provides some information on the proton density, but as the effective nucleon-nucleon interaction is dominated by the proton-neutron interaction, that scattering also gives information primarily of the neutron density.

Results of calculations of elastic and inelastic electron scattering form factors for the exotic isotopes of He and Li will be presented and discussed, as well as results for other light exotic nuclei, in order to highlight the information one may obtain from the new facilities. New results of calculations for the elastic electron scattering from exotic Sn and Xe isotopes will also be presented, as will be measured at SCRIT. Together with relevant intermediate energy proton scattering data, one can obtain a complete picture of the matter densities of exotic nuclei. The impact this will have on the descriptions of the structures of exotic nuclei will be discussed.